



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	Computer Science and Engineering
Course Name & code	:	Design and Analysis of Algorithms & CSE 2252
Semester & branch	:	IV & CSE
Name of the faculty	:	Enter name of the faculty.
No of contact hours/week:		3 1 3 4

ASSESSMENT PLAN

Course Outcomes (COs)

<i>At the end of this course, the student should be able to:</i>		No. of Contact Hours	Marks
CO1:	Apply techniques for designing algorithms to solve problems	16	33
CO2:	Analyse the various aspects which contribute to algorithm efficiency	8	16
CO3:	Describe the complexity of algorithm using asymptotic notations	4	9
CO4:	Classify the complexity of algorithm into different efficiency classes	5	11
CO5:	Analyse and classify algorithms into different categories	15	31
Total		48	100

Components	Surprise Quizzes	Sessional Tests	End Semester/ Make-up Examination
Duration	20 to 30 minutes	60 minutes	180 minutes
Weightage	20 % (4 X 5 marks)	30 % (2 X 15 Marks)	50 % (1 X 50 Marks)
Typology of Questions	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation	Knowledge/ Recall; Understanding/ Comprehension; Application	Understanding/ Comprehension; Application; Analysis; Synthesis; Evaluation
Pattern	Answer one randomly selected question from the problem sheet (Students can refer their class notes)	MCQ: 10 questions (0.5 marks) Short Answers: 5 questions (2 marks)	Answer all 5 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks
Schedule	4, 7, 10, and 13 th week of academic calendar	Calendared activity	Calendared activity
Topics Covered	Quiz 1 (L 1-7 & T _{y1-y2}) (CO 1)	Test 1 (L 1-17 & T _{b1-b2}) (CO 1&2)	Comprehensive examination covering full syllabus. Students are expected to answer all questions (CO 1-5)
	Quiz 2 (L 8-17 & T _{y3-y4}) (CO 2 &3)		
	Quiz 3 (L 18-27 & T _{y5-y6}) (CO 3 &4)	Test 2 (L 18-33 & T _{b3-b4}) (CO 3&4)	
	Quiz 4 (L 28-36 & T _{y7-y8}) (CO 5)		

Course Plan

L. No.	Topics	Course Outcome Addressed
L0	Click or tap here to enter text.	CO
L1	Introduction to course; What is an Algorithm?	CO1&CO5
L2	Fundamentals of Algorithmic Problem Solving, Important Problem Types	CO1&CO5
L3	Fundamental Data Structures, Analysis Framework	CO3&CO4
L4	Tutorial-1 : Examples on Data structure, Asymptotic notations	CO3&CO4
L5	Asymptotic Notations and Basic Efficiency Classes	CO3
L6	Mathematical Analysis of Non-recursive Algorithms and Recursive Algorithms	CO3&CO4
L7	Selection Sort and Bubble Sort	CO1&CO5
L8	Tutorial-2 : Example on Non-recursive, Recursive Algorithms and recurrence relation solution	CO3&CO4
L9	Sequential Search, Brute-Force String Matching	CO3
L10	Exhaustive Search	CO1&CO5

L11	Depth First Search(DFS), Breadth First Search(BFS)	CO1&CO5
L12	Tutorial-3 : Examples on Exhaustive Search DFS and BFS	CO1&CO5
L13	Insertion Sort	CO1&CO5
L14	Topological Sorting	CO1&CO5
L15	Binary Search	CO1&CO5
L16	Tutorial-4 : Examples on Binary Search Insertion sort, topological sorting	CO1&CO5
L17	Merge Sort	CO1&CO5
L18	Quick Sort	CO1&CO5
L19	Binary tree traversals and related properties, Multiplication of large integers	CO1&CO5
L20	Tutorial-5 : Examples on Merge Sort, Quick Sort, Multiplication of large integers	CO1&CO5
L21	Stassen's Matrix Multiplication	CO1&CO5
L22	Presorting, Balanced Search Trees – AVL trees	CO1&CO5
L23	Balanced Search Trees – 2-3 trees	CO2
L24	Tutorial-6 Examples on AVL tree, 2-3 tree	CO2
L25	Heaps and Heapsort	CO2
L26	Problem Reduction, Sorting by Counting	CO2
L27	Input Enhancement in String Matching –Horspool algorithm	CO2
L28	Tutorial-7 : Examples on Heaps and Heapsort , Horspool algorithm	CO2
L29	Boyer-Moore Algorithm	CO1&CO5
L30	Hashing	CO2
L31	Computing a Binomial Coefficient, Warshall's algorithm	CO1&CO5
L32	Tutorial-8 : Examples on Boyer-Moore Algorithm, Hashing, Warshall's algorithm	CO1&CO5
L33	Floyd's Algorithm	CO1&CO5
L34	Knapsack Problem Bottom-up	CO1&CO5
L35	Knapsack-Memory Functions	CO1&CO5
L36	Tutorial-9 : Examples on Floyd's Algorithm, Knapsack Problem Bottom-up & Memory Functions	CO1&CO5
L37	Prim's Algorithm	CO1&CO5
L38	Kruskal's Algorithm	CO1&CO5
L39	Dijkstra's Algorithm	CO1CO2

L40	Tutorial-10 : Examples on Prim's, Kruskal's & Dijkstra's Algorithm	CO
L41	Huffman Trees	CO1&CO5
CO1	Backtracking: n – Queen's problem	CO1&CO5
L43	Backtracking: Hamiltonian Circuit Problem, Subset-Sum Problem	CO1&CO5
L44	Tutorial-11 : Examples on Huffman Trees, Backtracking	CO1&CO5
L45	Branch-and-Bound: Assignment Problem, Branch-and-Bound: Knapsack Problem	CO1&CO5
L46	Traveling Salesperson	CO1&CO5
L47	P, NP and NP Complete Problems : Definition	CO4
L48	Tutorial-12 : Examples on Branch-and-Bound , P, NP problems	CO4
L/T		

References:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", 3rd Edition, Pearson Education, India, 2011.
2. Ellis Horowitz and Sartaj Sahni, "Computer Algorithms/C++", 2nd Edition, University Press, India, 2007.
3. Thomas H. Cormen, Charles E. Leiserson, Ronal L, Rivest, Clifford Stein, "Introduction to Algorithms", 2nd Edition, PHI, India, 2006.
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Submitted by: Click or tap here to enter text.

(Signature of the faculty)

Date:

Approved by:

(Signature of HOD)

Date:

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
